CLAIMS:

1. A cleaning method of a film-forming unit that forms a thin film on an object to be processed by supplying a process gas into a reaction chamber containing the object to be processed, the method comprising;

a purging step of purging an inside of the reaction chamber by supplying into the reaction chamber a nitrogen-including gas that includes nitrogen and that is capable of being activated,

wherein the purging step has a step of nitriding a surface of a member in the reaction chamber by activating the nitrogen-including gas.

2. A cleaning method of a film-forming unit that forms a thin film on an object to be processed by supplying a process gas into a reaction chamber containing the object to be processed, the method comprising;

a purging step of purging an inside of the reaction chamber by supplying into the reaction chamber a nitrogen-including gas that includes nitrogen and that is capable of being activated,

wherein the purging step has a step of activating the nitrogen-including gas and causing the activated nitrogen-including gas to react with metallic contaminant contained in a member in the reaction chamber so as to remove the metallic contaminant from the member.

3. A cleaning method of a film-forming unit that forms a thin film on an object to be processed by supplying a process gas into a reaction chamber containing the object to be processed, the method comprising;

a deposit-removing step of removing a deposit stuck to an inside of the film-forming unit by supplying into the reaction chamber a cleaning gas that includes fluorine, and

a purging step of purging an inside of the reaction chamber by supplying into the reaction chamber a nitrogen-including gas that includes nitrogen and that is capable of being activated,

wherein the purging step has a step of activating the nitrogen-including gas and causing the activated nitrogen-including gas to react with the fluorine diffused into a member in the reaction chamber during the deposit-removing step, so as to remove the fluorine from the

member.

4. A cleaning method of a film-forming unit that forms a thin film on an object to be processed by supplying a process gas into a reaction chamber containing the object to be processed, the method comprising;

a deposit-removing step of removing a deposit stuck to an inside of the film-forming unit by supplying into the reaction chamber a cleaning gas that includes fluorine, and

a purging step of purging an inside of the reaction chamber by supplying into the reaction chamber a nitrogen-including gas that includes nitrogen and that is capable of being activated,

wherein the purging step has a step of nitriding a surface of a member in the reaction chamber by activating the nitrogen-including gas.

5. A cleaning method of a film-forming unit according to any of claims 1 to 4, wherein

the nitrogen-including gas is ammonia, dinitrogen monoxide or nitric oxide.

6. A cleaning method of a film-forming unit according to any of claims 1 to 5, wherein

during the purging step, the inside of the reaction chamber is maintained at a range of 133 Pa to 53.3 kPa.

7. A cleaning method of a film-forming unit according to any of claims 1 to 6, wherein

during the purging step, the nitrogen-including gas is supplied into the reaction chamber heated to a predetermined temperature in order to be activated.

8. A cleaning method of a film-forming unit according to claim 7, wherein

during the purging step, the inside of the reaction chamber is heated to a range of 600 °C to 1050 °C.

9. A cleaning method of a film-forming unit according to any of claims 1 to 8, wherein

the member in the reaction chamber consists of quartz.

10. A cleaning method of a film-forming unit according to any of claims 1 to 9, wherein

the process gas comprises ammonia and a silicon-including gas,

the thin film is a silicon nitride film, and

the nitrogen-including gas is an ammonia gas.

11. A film-forming method comprising

a cleaning step of cleaning a film-forming unit in accordance with a cleaning method of a film-forming unit according to any of claims 1 to 10, and

a film-forming step of heating the inside of the reaction chamber containing the object to be processed to a predetermined temperature, and forming a thin film on the object to be processed by supplying a process gas into the reaction chamber.

12. A film-forming unit that forms a thin film on an object to be processed by supplying a process gas into a reaction chamber containing the object to be processed, the film-forming unit comprising;

a nitrogen-including-gas supplying unit that supplies into the reaction chamber a nitrogen-including gas that includes nitrogen and that is capable of being activated,

an activating unit that activates the nitrogen-including gas, and

a nitriding unit that nitrides a surface of a member in the reaction chamber by controlling the activating unit so as to activate the nitrogen-including gas.

13. A film-forming unit that forms a thin film on an object to be processed by supplying a process gas into a reaction chamber containing the object to be processed, the film-forming unit comprising;

a nitrogen-including-gas supplying unit that supplies into the reaction chamber a nitrogen-including gas that includes nitrogen and that is capable of being activated,

an activating unit that activates the nitrogen-including gas, and

a contaminant-removal controlling unit that removes metallic contaminant from a member in the reaction chamber by controlling the activating unit so as to activate the nitrogen-including gas and by causing the activated nitrogen-including gas to react with the metallic contaminant contained in the member.

14. A film-forming unit that forms a thin film on an object to be processed by supplying a process gas into a reaction chamber containing the object to be processed, the film-forming unit comprising;

a cleaning-gas supplying unit that supplies into the reaction chamber a cleaning gas that includes fluorine,

a nitrogen-including-gas supplying unit that supplies into the reaction chamber a nitrogen-including gas that includes nitrogen and that is capable of being activated,

an activating unit that activates the nitrogen-including gas, and

a fluorine-removal controlling unit that removes fluorine from a member in the reaction chamber by controlling the activating unit so as to activate the nitrogen-including gas and by causing the activated nitrogen-including gas to react with the fluorine diffused into the member.

15. A film-forming unit that forms a thin film on an object to be processed by supplying a process gas into a reaction chamber containing the object to be processed, the film-forming unit comprising;

a cleaning-gas supplying unit that supplies into the reaction chamber a cleaning gas that includes fluorine,

a nitrogen-including-gas supplying unit that supplies into the reaction chamber a nitrogen-including gas that includes nitrogen and that is capable of being activated,

an activating unit that activates the nitrogen-including gas, and

a nitriding unit that nitrides a surface of a member in the reaction chamber by controlling the activating unit so as to activate the nitrogen-including gas.

16. A film-forming unit according to any of claims 12 to 15, wherein

the nitrogen-including gas is ammonia, dinitrogen monoxide or nitric oxide.

17. A film-forming unit according to any of claims 12 to 16, wherein the activating unit is a heating unit.

18. A film-forming unit according to any of claims 12 to 16, wherein the activating unit is a plasma-generating unit.

19. A film-forming unit according to any of claims 12 to 16, wherein the activating unit is a heating unit that heats the inside of the reaction chamber to a range of 600 °C to 1050 °C.

20. A film-forming unit according to any of claims 12 to 19, further comprising

a pressure-adjusting unit that maintains the inside of the reaction chamber at a range of 133 Pa to 53.3 kPa.